

I claim:

1. A method for operating a gas turbine engine after the engine reaches self-sustaining speed but prior to the engine reaching synchronous speed, comprising the steps of:

- a) sensing that the turbine engine has reached self-sustaining speed;
- b) disabling an external electric source;
- c) defining a moderate EGT;
- d) creating a table for looking up acceleration rates based upon a function with variables of (1) speed of the engine rotor or turbine drive shaft, (2) temperature of the compressed air supplied to the combustion chamber, and (3) EGT;
- e) enabling a timing device;
- f) monitoring the EGT of the gas turbine engine, the speed and acceleration rate of the gas turbine engine, and the temperature of compressed air supplied to a combustion chamber for combustion of the gas turbine engine;
- g) requesting an acceleration rate from the table by a control system;
- h) enabling a PID controller of the control system to request a fuel valve position based upon the requested acceleration rate and an actual acceleration rate of the gas turbine engine;
- i) enabling a PID controller to request a fuel valve position based upon the defined moderate EGT and an actual EGT of the gas turbine engine;
- j) selecting the requested fuel valve position based upon the request that results in the lesser amount of fuel being supplied to the combustion chamber;
- k) exiting the control system upon the engine reaching synchronous speed;
- l) exiting the control system upon the engine not reaching synchronous speed within a predetermined time in order to shutdown and purge the combustion chamber; and
- m) repeating steps (f)-(m) until synchronous speed is reached.

2. A method for operating a gas turbine engine after the engine reaches self-sustaining speed but prior to the engine reaching synchronous speed, comprising the steps of:

- a) defining a moderate EGT of the gas turbine engine;

- b) monitoring the EGT of the gas turbine engine, the speed and acceleration rate of the gas turbine engine, and the temperature of compressed air supplied to a combustion chamber for combustion of the gas turbine engine;
- c) requesting a desired acceleration rate of the gas turbine engine by a control system;
- d) enabling a controller of the control system to request a fuel valve position based upon the requested acceleration rate and an actual acceleration rate of the gas turbine engine;
- e) enabling the controller to request a fuel valve position based upon the defined moderate EGT and an actual EGT of the gas turbine engine;
- f) selecting the requested fuel valve position based upon the request that results in the lesser amount of fuel being supplied to the combustion chamber; and
- g) exiting the control system upon the engine reaching synchronous speed.

3. The method as claimed in claim 2, further comprising the step of creating a table for looking up acceleration rates based upon a function with variables of (1) speed of a engine rotor or turbine drive shaft of the gas turbine engine, (2) temperature of compressed air supplied to a combustion chamber of the gas turbine engine, and (3) EGT.

4. The method as claimed in claim 2, further comprising the step of sensing that the turbine engine has reached self-sustaining speed.

5. The method as claimed in claim 4, further comprising the step of disabling an external electric source used for accelerating the gas turbine engine.

6. The method as claimed in claim 3, wherein an acceleration rate is requested from the table.

7. The method as claimed in claim 2, further comprising the step of enabling a timing device to determine when to exit the control system.

8. The method as claimed in claim 7, further comprising the step of exiting the control system upon the engine not reaching synchronous speed within a predetermined time in order to shutdown and purge the combustion chamber.

9. The method as claimed in claim 2, further comprising the step of repeating steps (a)-(g) until synchronous speed is reached.